Title: Validation of silicon detector simulations in the Belle II experiment

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Abstract: This bachelor thesis deals with testing of simulations for planned combined Belle II PXD and SVD testbeam at DESY, Germany. This testbeam is going to study the function of a setup of six detectors, two DEPFET pixel detectors and four strip detectors, which corresponds to the actual arrangement of the internal detector of the newly built experiment Belle II in KEK, Japan. For the purpose of testing a new module in the basf2 Belle II software framework was developed. This module should also be used in the future for analysis of experimental data from the testbeam and to compare the results with simulations. In addition to the theoretical knowledge about the Belle II experiment, silicon detectors and basf2, experience with experimental work in the clean room at IPNP was obtained.

The theoretical part of this work reviews the physical motivation of the experiment as well as the arrangement and operation of the Belle II detector. In the second part we discuss silicon detectors with an emphasis on DEPFET detectors. We then describe the Belle II software framework, basf2, which provides simulation, data handling and reconstruction at Belle II as well as at the testbeam. The final part of the thesis describes work in the clean laboratory and development of a new basf2 module for data analysis. Finally, the residuals before and after tracking are evaluated and compared.

Keywords: Belle II, DEPFET, basf2, tracking, simulation